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ANALYSIS OF DEPARTMENT OF DEFENSE (DOD) OVERSEAS SHIPMENT OPERATIONS TO JAPAN

by

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The objective of this thesis is to document, evaluate, and recommend process improvements for transporting fresh produce product lines from the United States to mainland Japan. This thesis will review existing processes and strategies currently in effect for shipping fresh produce to Department of Defense (DoD) installations and other U.S. federal agencies in Japan.

The shipment of fresh fruits and vegetables (FF&V) will be examined in detail, since they pose the most difficult logistical challenge. Aside from the issues associated with shipping perishable products overseas, there are political and cultural issues that will be examined as well.

The entire process, from customer requirement order to delivery of product to destination will be documented and analyzed. The current strategy and methods of purchasing, shipping, and distributing FF&V to resale customers in Japan will be analyzed, with recommendations for improvement, if applicable.

A process management and decision chart of the entire process will be developed, in hopes of providing a decision matrix that will apply to all shipments destined for mainland Japan, and possibly to other Pacific Rim destinations. Lessons learned and further research will be identified that may be applicable to other destinations in the region.

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ANALYSIS OF DEPARTMENT OF DEFENSE (DOD) OVERSEAS SHIPMENT OPERATIONS TO JAPAN

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Submitted in partial fulfillment
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I. INTRODUCTION

A. THESIS STATEMENT: ANALYSIS OF DEPARTMENT OF DEFENSE (DOD) OVERSEAS SHIPMENT OPERATIONS TO JAPAN

The Council of Logistics Management offers the following definition to describe the activities involved in material logistics;

> Logistics is the process of planning, implementing and controlling the efficient, cost-effective flow and storage of raw materials, in-process inventory, finished goods and related information from point of origin to point of consumption for the purpose of conforming to customer requirements. [Blanchard 92]

The objective of this thesis is to document and evaluate the entire logistic process involved with sending fresh produce from the continental United States to Department of Defense (DoD) customers in mainland Japan. All facets of the logistic process associated with fresh fruits and vegetables (FF&V) will be analyzed in detail, since they often pose the greatest challenge in satisfying customer requirements.

DoD ships a variety of fresh produce to overseas locations in the pacific region. Defense Personnel Support Center (DPSC) is responsible for ensuring fresh produce is delivered to all of the DoD customers in this region. [DPSC 97] Each destination in the pacific rim has specific requirements and subtleties that impose challenges on the purchasing, shipping and expediting organizations involved in getting the product to the customer. The Defense Commissary Agency (DeCA) activities comprise approximately 70% of the business for these overseas shipments, making them the largest DPSC customer. [Allman 97]

Therefore, DPSC wants to deliver fresh produce to the DeCA customer destinations in Japan in an effective and economical manner. This thesis will use the commissary in Yokosuka, Japan, as the model customer for the purposes of this analysis since they represent the largest customer base for DPSC in Japan.

As in all public sector operations, DoD resources and customer requirements may not mutually coexist. This thesis will develop a process and decision chart that will model the functions required to move fresh produce to DoD customers in Japan.

Many non-perishable products (such as dry and canned goods) are not severely constrained by shipment method and/or environmental conditions. These items can be shipped with relative ease and do not require the management attention that fresh produce items require. Therefore, this thesis will deal *only* with fresh fruits and vegetables, since they pose the most difficult problem for management and shippers.

B. RESEARCH QUESTIONS AND DISCUSSION

The research questions and discussion encompassed by this thesis will include issues arising from current processes for overseas shipment to Japan, who the customers are, product out-turn, and where DoD stands in comparison to private industry. The roles and responsibilities of the organizations involved in this process will be discussed and evaluated considering the value that they add to the process.

1. **How does it work?** How a requirement from a customer eventually translates into the purchase and shipment of items will be explained, as well as order and shipping time issues. The products and services that are now privately contracted is an issue that may have a significant bearing on how efficiently goods are being received and delivered to the various customers in Japan. This will lead to determining how transportation and handling costs may be reduced. DeCA activities are provided appropriated funds for transportation costs, civilian pay (CIV PAY), headquarters costs, and Temporary Duty (TDY) for military members. [Allman 97] With constant pressure on decreasing this appropriated budget, DeCA commissaries must look for more economical methods to acquire products for resale to the patron.

2. **Politics, quarantines and market issues specific to Japan – how do they affect the process?** Some of the more subtle areas, such as the political, cultural, and governmental practices of Japan that impact the distribution of products to U.S. customers will also be examined. This will illuminate some of the Japan-specific issues with which the local customers and business partners deal on a routine basis. Examples include quarantine restrictions and product embargoes.

3. **How does the private sector move FF&V to the Pacific Rim?** Private industry is faced with logistics challenges in shipping to overseas customers that are similar to those confronted by DoD. This thesis will compare the practices and procedures between the private sector and DoD.

4. Who actually ships fresh produce overseas (Japan) for DoD? DPSC - Pacific, located in Alameda, CA, is administratively responsible for all Pacific rim DoD ship, camp and station customers in Guam, Japan, Okinawa, and Korea. DPSC also services other non-DoD federal agencies in these same countries. The Defense Subsistence Office (DSO) - San Francisco, currently located in Union City, CA, actually coordinates the operational aspects of moving products to domestic and overseas customers. They buy the produce and let contracts with private companies to ship the items overseas. Every organization involved will be discussed, with emphasis on the value each adds to the process.

5. How does DoD actually get fresh produce to the customer located in mainland Japan? How DSO-San Francisco manages and executes the entire process, from the inception of the customer's order to the actual receipt of product by the customer will be examined. From this analysis, the best possible procedures for purchasing, transporting, and delivering those items under a severe time constraint will be recommended. Some aspects that will be discussed are the booking times, sea transit times, and perishability of items.

6. Is DoD shipping fresh produce to Japan in a cost-effective manner, while meeting the needs of the customer? This thesis will attempt to develop a model that will be applicable to any overseas shipment to Japan and possibly to other Pacific Rim DoD customers. It will be compared to private industry practices and applicable solutions will be recommended. In summary, the best overall process for transporting a variety of fresh produce products from the U.S.

to Japan will be developed, with the intention of applying lessons learned to other destinations in the region.

The ultimate goal for this thesis is to identify, document, and analyze the current policy and procedures for delivering perishable food items to the commissaries in mainland Japan. Recommendations will be offered to add value to the process.

C. SCOPE

The scope of this thesis will include the following major subject areas:

1. **Research on the organizational structure of DPSC.** Who sets policy, who actually ships products overseas, the current procedures and associated issues of shipping perishable items to DoD customers in Japan.

2. **Research and development of current issues**. Receiving and distributing perishable items in mainland Japan require coordination and management with local officials. This will include political, cultural, quarantine regulations, and any other Japan-unique issues that DoD must deal with in order to get the product to destination.

3. **A review of how private industry conducts similar business practices.** Are the issues the same? Do they ship in the same quantities to similar customers? Some areas may be applicable and provide insight for better methods that DoD can adopt.

4. **A recommendation of the best possible process**. A Process chart with each decision made for DoD shipments originating in the U.S., destined for

mainland Japan will be developed. The development of this chart will have applications for other Pacific Rim DoD customers.

D. METHODOLOGY

The methodology used for this thesis will include a literature research of books and available resources on some of the more academic areas, such as transportation modes. Policy and procedures used by the DoD and private industry operational shippers will be conducted by personal and telephone conversation interviews. Information and observations from interviews with personnel from the following government agencies will be included in this thesis:

-DPSC-Headquarters, Philadelphia, PA;

-DPSC-PACIFIC, Alameda, CA;

-DSO-San Francisco, CA;

-DeCA Yokosuka, Japan;

-DeCA Region Northwest, Seattle, WA;

-Material Traffic Management Command – Western Area (MTMC -WA), Oakland, CA.

In addition, the following commercial exporting and shipping companies will be interviewed:

-Sea Land;

-American President Lines (APL);

-Paramount Export Incorporated

-Federal Express

-Northwest Airlines

-United Parcel Service

The following areas will be specifically addressed:

Product lines that DSO-San Francisco is shipping and the issues with perishable items/mixing product lines. This thesis will determine ways to minimize costs of transportation and handling without sacrificing product quality and delivery service.

E. JAPAN-SPECIFIC ISSUES

Although there are many issues that are applicable to all shippers and customers, Pacific Rim customers also have a handful of location specific issues that need to be addressed. For example, Japan has a very strict clearing procedure and quarantine regulation. The political environment can affect what items are allowed in country (quarantine and embargo lists), from what location outside of Japan, and in what quantity. This may result in limiting the customer's demands. Cultural issues, from local holidays to interpersonal relationships and behavior, can delay the process.

There is also the issue of the transportation infrastructure in the Kanto Plain of Japan, where many DoD customers are located. The roads that are not major highways are narrow and difficult to negotiate, particularly with full vans and trucks. These issues will be examined as to their impacts on the process and recommendations for meeting the local demands will be offered.

F. CONCLUSIONS

The conclusion to this thesis will produce a summary of the findings on the aforementioned issues and questions. Lessons learned, recommendations for process improvements, and ideas for further research will be offered.

G. BENEFIT OF STUDY

The benefit of this study is an in depth analysis of the current policies and procedures for moving FF&V to DoD customers in Japan. Specifically, DoD may benefit if alternative methods or practices are recommended or identified that can save taxpayer dollars while satisfying customers. At a minimum, it should provide the foundation for further research in other Pacific Rim areas.

II. BACKGROUND

A. SUBSISTENCE

The following information is provided by DPSC on the history and events that lead to the evolution of DPSC and how DoD customers have subsistence items provided to them.

> Prior to 1940, each Military Service was responsible for the procurement and distribution of their subsistence items. In 1941, based on the recommendation of the Hoover Commission study to centralize perishable food management into one organization, the Market Center System was established under the Army Quartermaster Corps (QMC). This organization sought and hired high quality experts from industry to serve as buyers and managers, supplementing Army personnel.
>
> Throughout the 1940s and 1950s, the mission of the QM Market Center System expanded rapidly. Eleven regions were established in the United States, each with an Army QMC Commanding Officer. In geographical areas where there was a heavy concentration of Navy activity, Navy liaison personnel supplemented the Army workforce. In 1953, the initiative to centrally procure semi-perishable subsistence and operational rations was undertaken. Consequently, the Defense Subsistence Supply Center was established in Chicago to perform these centralized procurement functions, with eight decentralized regional headquarters left to manage the perishable subsistence items.
>
> The 1960s brought still more change. The Defense Supply Agency (now Defense Logistics Agency) was established to centralize further the

management of common items for the military—including Subsistence. In 1965, the Defense Subsistence Supply Center, the Defense Clothing and Textile Supply Center, and the Defense Medical Supply Center were consolidated to form the present Defense Personnel Support Center (DPSC) in Philadelphia.

DPSC was tested almost immediately with the military buildup and escalation of the Vietnam War. Until the mid 1960s, the demand for food was largely for non-perishables: both canned and dehydrated. But in 1966 thousands of portable, walk-in, refrigerated storage boxes filled with perishable beef, eggs, fresh fruits, and vegetables began arriving in Vietnam—a logistics miracle. Change continued at a rapid pace throughout the 1970s and 1980s. The Direct Commissary Support System (DICOMSS), a data processing system to manage semi-perishable food items, was implemented. Defense Subsistence Region consolidations were undertaken (eight regions were reduced to four—New York, New Orleans, Chicago, and Alameda); the Defense Integrated Subsistence Management System (DISMS) task force was established, merging the various ADP systems used to manage Subsistence workload into a single system; and the European subsistence storage mission was assumed. Three landmark occasions reached during this period were the establishment of Defense Subsistence Regions Pacific and Europe in 1974, and Atlantic in 1985. Finally, in 1981, the Subsistence Director assumed the responsibility of both Director of Subsistence, DPSC Headquarters and Commander, Subsistence Field Activities.

Today, the Subsistence Directorate's 800 people serve as the essential link between the Armed Forces and the U. S. Food Industry. In addition to the support provided to America's Armed Forces personnel and their dependents, support is provided to other Federal Agencies, the Veterans Administration, Public Health Service hospitals, and the District of Columbia School District. DPSC's management of food operations is decentralized through three Defense Personnel Support Center Regions (DPSCRs) in Philadelphia, PA, Alameda, CA, and Wiesbaden, Germany. The DPSCRs are responsible for the procurement, storage, quality assurance, and delivery to their regional customers. Subsistence also operates 26 food buying activities-Defense Subsistence Offices-which included in the United States, Germany, and the United Kingdom. Twenty-two of those offices are under the direction of DPSC Atlantic and four offices by DPSC Europe. These offices are responsible for buying and monitoring the storage and shipment of fresh fruit and vegetable items, less-than-car lot quantities of chill, and freeze items. DPSC headquarters generally buys car lot quantities of fresh fruits and vegetables by on-site field buyers. The Directorate of Subsistence is involved with the movement of about 30,000 forty-foot containers per year.

The 1990s have brought new challenges and roles. Significant support was provided during Desert Shield/Storm, Hurricane Andrew relief efforts, Operation Restore Hope (Somalia Relief), Operation Provide Promise (Bosnian Relief), and Cuban/Haitian relief efforts. The Subsistence Directorate at DPSC is also implementing many new

initiatives, including projects such as the use of Electronic Data Interchange (EDI) to enhance communication with producers and vendors. The establishment of a Direct Delivery System allows high-volume staple items to be delivered directly to base warehouses instead of interim depot storage locations and the conversion of military specification items to commercially available items. [DPSC 97]

DPSC is the primary activity that ensures the management and execution of purchasing, shipping, and delivering of fresh produce items to DoD customers in mainland Japan. The above text provides a baseline for the history of subsistence in our armed forces. The following portions of this chapter will describe the DPSC organization and its roles and responsibilities in more detail.

B. DEFENSE PERSONNEL SUPPORT CENTER (DPSC)

One of the topics in this area that will be examined is the relationship between the operational offices and the administrative offices. A look at the organizational structure and dynamics may assist in explaining the business practices.

Defense Personnel Support Center (DPSC) - Pacific, located in Alameda, CA, is administratively responsible for all Pacific rim DoD ships, camps and stations customers in Guam, Japan, Okinawa, and Korea. DPSC also services all US Federal agencies in these same countries. DSO - San Francisco, currently located in Union City, CA, actually conducts the operational aspects of buying and moving products. [DPSC 97]

1. DPSC Performance and Organization

DPSC has continued a downward trend in employment that matches the drop in gross sales from military troop restructuring. Since 1995, DPSC has reduced its workforce by seven percent while gross sales dropped by only five percent. This led to a reorganization to improve the way it does business. DPSC currently has 10 commodity business units; each concentrating around a group of items (i. e., fresh fruits and vegetables).

There are three DPSC locations that provide direct service for perishable subsistence; DPSC headquarters in Philadelphia, PA, DPSC Pacific in Alameda, CA, and DPSC Europe, located in Mainz Kastel, Germany. There are branch administrative offices ranging from FT Detrick, MD, to Copenhagen, Denmark. [DPSC 97] The particular area of concern of this study will deal with DPSC headquarters, DPSC Pacific, and DSO San Francisco. Specifically, the area under the Subsistence Commodity Business Units entailing produce shipped out of DSO San Francisco will be examined in detail. Figure 1, below, depicts the DPSC command relationships.

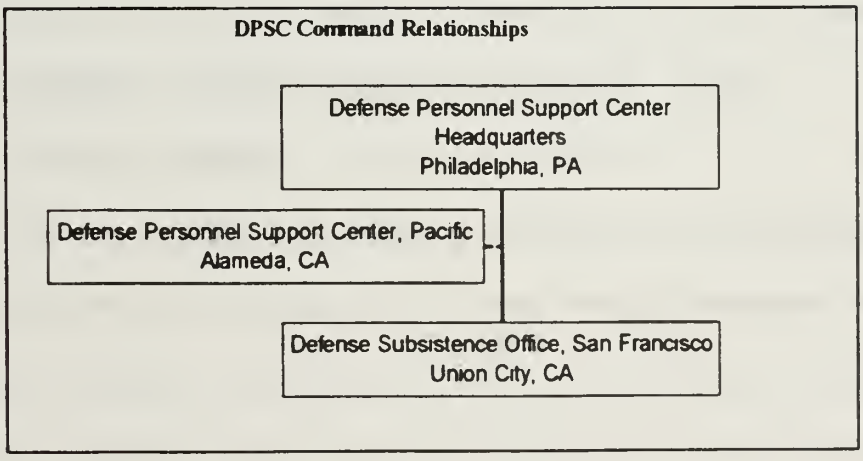

Figure 1

2. DPSC Financial Performance

In FY 1996, DPSC sold over $3.1 billion of food clothing and medical supplies to worldwide customers. While Clothing, Textile, and Medical sales increased, Subsistence sales responded in 1996 to the first full year without brand name sales. New business practices resulted in sales increases in other markets, with total subsistence sales over $1 billion dollars. Troop sales increased by $43 million and other DoD sales. Prime Vendor sales increased $103 million. Figure 2 shows the dollar values of sales in the DPSC functional areas. [DPSC 97]

TOTAL SALES

(Approximate, in millions)

	1996	1995	1994	1993
Subsistence	$1,106.7	$1,509.1	$1,631.5	$1,804.3
Clothing & Textiles	1,060.7	969.3	1,045.1	1,209.3
Medical	1,025.4	880.6	744.7	809.3
Totals	**$3,192.8**	**$3,359.0**	**$3,421.3**	**$3,822.9**
DoD	3,122.2	3,296.7	3,357.6	3,725.5
Non-DoD	70.6	62.3	63.7	

Figure 2

3. DPSC-Pacific

a. Organization

DPSC Pacific consists of 20 personnel located in the pacific region with the mission of supporting DPSC customers with food, clothing, and medical items. DPSC Pacific has 388 customers, including 98 Defense Commissary Agency Customers, 20 Air Force customers, 18 Army customers, 17 Navy customers, 182 ships of the Pacific Fleet, and 53 non-defense customers. DPSC Pacific is one of two major field offices for DPSC in Philadelphia. DPSC Pacific interprets all of the doctrine and political and policy issues for subsistence, clothing and textile shipments to customers in the Pacific, including Guam, Korea, Japan, Okinawa, and various other smaller customer locations. [DPSC 97]

b. Change

Starting in 1991, DPSC HQ took over the item management/contracting aspects of DPSC Pacific's operation. Now, DPSC Pacific is a mere 20 people, down from some several hundred in the late 80's. The necessity for DPSC Pacific still exists due to the theater unique experience required to maintain satisfied customers in the region. [DPSC 97]

c. Improvements

One way to attain both low costs and superior service is to deliver products with minimum variance. In this context, minimum variance refers to the time, location, quantity, and method of delivery of the products. From the customer's perspective, when the ordered quantity of a product is delivered at an

agreed upon time, every time, the receipt and storage processes become more efficient. Labor costs are minimized, mistakes are reduced in inventory and receipt of the delivery, and the stowage usually occurs in a more accurate and timely manner. Minimum variance, as it relates to the delivery of products, leads to efficient logistical procedures from receipt to merchandising the product for sale.

Some of the things that have been done to improve service in this area, namely more timely, more accurate, and therefore more predictable delivery of subsistence items, is the installation of a "tri-commodity logistics specialists" in Korea, Japan, Hawaii, and Alaska. [Allman 97]

Commercial freight forwarding is another program initiated in Japan, which has had a positive impact on the distribution of FF&V in mainland Japan. The freight forwarders are delivering goods twice a week instead of the normal once a week delivery, improving service in two ways:

-Reducing delivery variability, leading to more efficient receipt processes for the customer and usually a fresher product;

-Providing additional space to store product at optimum temperatures until it can be merchandised by the commissary. [Ali 97]

The forwarders enable DSO to maximize vanload capacity. They can do this by holding half of the goods in a warehouse close to the port facility, then moving the commodities to the local customers two times a week (instead of once a week) with a multiple-stop delivery method in trucks that are properly loaded to deliver to each customer. By delivering less, with more frequency, the

produce manager is better able to receive, store, and merchandise the items. Maximizing vanload capacity is important because economies of scale can be achieved if fewer vehicles, with full loads, are used instead of sending separate vehicles only partially full to each customer.

Additionally, the DSO is able to maximize vanload capacity from the U.S. to the port in Japan, by shipping compatible FF&V products in the same van. By doing this, it is as if the shipment is delivered to a distribution point (the freight forwarder), for further distribution to the customer. Previously, requirements were consolidated into one van. A van was not forwarded until enough customers had ordered to fill the van completely. The van then went to the Naval Supply Depot, Yokosuka (now Fleet and Industrial Supply Center (FISC), Yokosuka), where it was separated and re-listed for delivery to various customers. This was a problem because the central distribution point (NSD Yokosuka) did not work for DPSC. NSD Yokosuka set it's own priorities and shipments to customers were based on NSD Yokosuka's schedule. If deliveries were late, it was due because either proper paperwork was not included in the shipment or NSD Yokosuka had other deliveries or work that took priority over the produce deliveries. Therefore, responsibility for satisfying the ultimate customer was blurred between DPSC and NSD Yokosuka. If the customer received less than acceptable produce, both DPSC and NSD would place the blame on each other. DPSC delivered to the distribution point, the Supply Depot received it, and delivered as soon as possible according to their own priorities, which may not match the priorities of DPSC or the customer. In addition, storage

of the commodities while residing at NSD Yokosuka was not optimal. Commodities were not grouped according to compatibility and were not stored at optimum temperatures. Therefore, shelf life was not preserved prior to distribution to the customer, leading to poor quality product ultimately being delivered to the customer. [Jones 97]

C. CURRENT ISSUES

Defense Commissaries overseas still have problems which are at issue:

1. There is not a trained cadre of produce managers in Defense Commissary Agency stores located in pacific rim commissaries.

Floor supervisors and cash register employees (typically GS-5/6 grade employees) that perform well are usually "promoted" to run the subsistence or produce portion of the operation at the Commissary, after a period of good performance. Upon promotion, they are responsible for placing orders and managing a variety of product lines, most of which are highly perishable and require constant attention. Ordering, receiving, storing, inventorying, and merchandising highly perishable items is a relatively simple operation in the US where products can be ordered one day and received the next day. Overseas, however, is another story. Order and shipping times dictate that the produce manager be aware of purchasing trends by the patron, seasonal demands, and availability of products that need to be transported across the Pacific Ocean. The DoD patron in Japan expects and demands the same FF&V that he would be able to purchase in the U.S. [Allman 97] Without proper training and experience

overseas, produce managers may not be cognizant of U.S. seasonal produce availability or the likelihood of some produce commodities to even survive shipment at all. Limited knowledge on their part regarding receiving procedures as well as a lack of understanding of optimum storage requirements leads to early deterioration of product.

Concurrent with this increase in responsibility, many of these overseas managers naturally intend to return to the U.S., (which is usually concurrent with a promotion). The entire personnel turnover process repeats itself, ensuring little corporate knowledge is maintained and a lack of stability for the workers under the management. Instead of creating produce and subsistence managers with experience and expertise, the management of produce in many pacific rim overseas commissaries is a stepping stone to another job. Therefore, proper management of the goods is difficult to maintain after it arrives at a customer installation. [Allman 97]

This is important to DPSC as a supplier, because the performance of the DeCA commissary produce manager directly reflects on DPSC's ability to please the customer. Mistakes made on the part of the produce manager can result in higher Not-in-Stock (NIS) rates, by ordering out of season items. Over-ordering, not receiving items properly, and not maintaining produce at proper temperatures can lead to a higher spoilage rate. This can lead to lower demand rates. Basically, the produce manager "drives" the demand rate by what he chooses to place in the commissary. This impacts the range and depth of items DPSC procures for delivery to the commissary. Therefore, if produce managers were

more experienced, they could place orders that would accurately reflect seasonal availability and customer demand. This would reflect favorably on DPSC's ability to please the customer.

2. Japan's transportation infrastructure layout is a logistical challenge for moving perishable goods to a variety of locations within mainland Japan.

The roads are often too small for conventional sized vehicles to negotiate. Therefore, smaller vehicles must be used, off setting the economies of scale that would normally exist for a well designed, multiple stop delivery route. [Allman 97] This increases transportation costs. In an optimal scenario, a multiple-stop delivery route would enable a truck to deliver a range of products to numerous customers. The load on the van would be arranged by customer order. The route would be designed around a "center of gravity" of destinations, or a cluster of similar customers, which allows the truckdriver to follow a direct path from customer to customer. In short, the driver leaves the origin, delivers the products, and returns to the origin without duplicating his path. The truck is able to deliver a number of orders efficiently, quickly, and in a timely manner. Some of the economies realized in this method are fuel consumption savings, maximum vanload configurations, product storage, and a specific delivery timetable.

Because multi-stops using 40 foot container vans are difficult to maneuver in most areas of Japan, the commercial freight forwarders become involved. They have large warehouses and small trucks. Although this is not ideal from a

business logistics analysis perspective, they are able to solve some of the aforementioned problems. Their trucks are small enough to negotiate the roads leading to the various destinations. More runs are required, product inventory holding costs are higher, but the products are delivered on time and usually in good condition. The freight forwarders also have the ability to expedite the processes of entry procedures and quarantine/pest infestation inspections. Since freight forwarder personnel are commercial businesspersons that live and work in the local area, communications with inspectors is prompt, resolving paperwork and entry procedure problems if they should arise. [Thompson 97]

3. DPSC must confront the question of exactly who are the customers, and how to ensure they are all satisfied.

When DPSC delivers goods to a specific commissary, such as DeCA Yokosuka, DPSC is not only really serving the Commissary Officer and the Produce Manager at Yokosuka. DPSC also serves DeCA Headquarters and DeCA Northwest Region, who ultimately oversee the Yokosuka Commissary. All of these organizations have a somewhat different point of view of what is needed, and all must be adequately served. [Graven 97]

The produce manager primarily cares about having products on hand to meet daily customer demands. Secondary concerns involve the actual receipt, storage, and merchandising of the delivered products. The Commissary Officer must fit the produce manager's requirements into his requirements for the entire commissary operation. The Commissary Officer is concerned with the budget (labor), and ultimately, that the operation runs in a profitable manner, so that

costs to the patron are minimized. Likewise, the regional office of the commissary and headquarters have requirements in terms of information, budgetary constraints, transportation expenses, and overall service concerns for which they are accountable. Therefore, DPSC must be able to please DeCA, as a customer, on multiple levels. [Kerber 97]

III. CUSTOMER BASE / MODES OF TRANSPORTATION

A. DOD CUSTOMERS IN MAINLAND JAPAN

Before discussing the modes, it is important to identify the customers. It is important because different types of customers desire and sometimes require different modes of shipment. The proper method of delivery to the customer can significantly assist in getting the product on the shelf or issued to the troops. DPSC Pacific (and therefore the DSO) deliver to two primary categories of customers, Troop and Resale activities.

Resale activities are mainly Working Capital Fund activities, and have some significant issues with respect to the manner in which they conduct business that directly relates to modes and methods of receiving products. Essentially, resale activities operating under working capital fund requirements are obligated to "break even " in financial terms. Costs associated with the purchase, receipt, care, transportation, handling, and disposal of perishable products in most cases must be passed to the customer in order to operate "in the black" from a business perspective.

Troop activities include the Fleet and Industrial Supply Center (FISC), Yokosuka, Marine Corps Air Station (MCAS), Iwakuni, and Yokota Air Base, Troop Support. Resale activities are comprised of activities such as the Atsugi, Misawa, and Yokosuka commissaries. Figure 3 gives the major organizations in mainland Japan for whom DPSC is responsible. As such, they provide the

soldiers, airmen, marines, sailors, their families, and other non-Department of Defense customers with food, clothing, equipment, and medical supplies:

Defense Personnel Support Center (DPSC) DoD Customers in Mainland Japan

Resale Organizations	*Troop Activities*
DeCA Yokota Commissary	**Fleet and Industrial Supply Center (FISC), Yokosuka**
DeCA Atsugi Commissary	**Yokota Troop Support**
DeCA Iwakuni Commissary	**Marine Corps Air Station, Iwakuni**
DeCA Sagamihara Commissary	**Camp Zama MWR**
DeCA Yokosuka Commissary	
DeCA Sasebo Commissary	
New Sanno Hotel, Tokyo	
Army and Air Force Exchange Service (AAFES), Yokota	
Negishi Navy Exchange (Tokyo)	

Figure 3

It is possible to purchase some U.S. FF&V products on the local economy, but the prices are likely to be higher. For example, a cantaloupe sold in the DeCA Yokosuka Commissary costs approximately two to three dollars, depending on the time of year. In the town of Yokosuka, at a local market, a cantaloupe of the same quality can cost as much as *fifty-five U.S. dollars.* [Graven 97]

Produce entering the mainland of Japan, destined for DoD installations, is not subjected to the same tariffs and duty charges that are imposed upon produce

destined for the local economy. Because of the high costs associated with the entry of the produce onto the local market, there is not an abundance of it and it is therefore priced higher. The Japanese is customer is willing to pay fifty-five dollars for a cantaloupe so the system works. Supply and demand dictates that if the customer will bear the market price, the supplier will continue to sell the product at that price.

Because of these economic factors contributing to the incredibly high costs of many U. S. produce items on the local Japanese market, commissaries in Japan have a monopoly on U.S. produce for DoD customers. Keeping the costs of these products reasonable through efficient transportation and handling is the key to ensuring that the DoD patron can afford to buy what he wants in Japan.

Now that the activities that sell products to DoD patrons, and their location, have been described, it is important to discuss the most economical method to transport produce from the U.S. to Japan. There is much more involved than just getting the shipment from the U.S. to Japan on time. The DoD patron in Japan expects to be able to buy a *fresh* head of lettuce in the DeCA commissary. The next sections contain definitions and some discussion of the three primary modes used to get fresh produce to the activities that provide for the DoD military and civilians in mainland Japan.

B. MODES OF DELIVERY

There are several methods by which DoD Pacific Rim customers receive products:

One method is by Controlled Atmosphere Reliable Transportation System (CARTS). This is a method by which perishable items are moved in sea van containers on commercial ships (also referred to as the surface mode). The internal environment of each container is rigidly controlled with respect to temperature, humidity, and gas mixture. This retards the aging process of the grown product and under some conditions can act as an insecticide controller for pest infestation. [Brecht 92]

A second method for moving perishable food cargo overseas is by commercial and military airlift. Although an expensive mode in terms of transportation costs, this mode is currently utilized for sensitive produce and urgent requirements.

The third method is not a mode of transportation, rather a method of procurement. Items can also be purchased on the local Japanese economy. The following paragraphs in this chapter will discuss the methods normally used to deliver fresh produce to the customer, and related issues with each.

1. Controlled Atmosphere Reliable Transportation System (CARTS)

This is the preferred method of transporting most FF&V commodities to pacific rim DoD customers. There are several advantages;

- It is cheaper than buying produce in the local Japanese markets. This is because the cost of fresh fruits and vegetables are very expensive in Japan.

Japan marks the price of these items up based on their cost to import plus a profit margin. By using CARTS, the cost to the commissary officer of fresh produce is priced slightly higher than the wholesale U.S. market price since it is bought, loaded and shipped from the U.S. and is not burdened with additional tariffs.

- The customer in pacific rim commissaries is able to get the same product, at almost the same price, as customers of stateside commissaries (an important issue for the DoD customer overseas),

- There are items that can be purchased from foreign countries that meet the commissary demand for produce which is out of season in the U.S. These items are delivered stateside, then loaded in controlled atmosphere containers for delivery to Japan. Although the product undergoes some aging prior to arriving in the U.S., it can still be delivered to the customer in a satisfactory condition by CARTS. [Brecht 92]

It is possible to substantially retard the maturation process and preserve the shelf life of an FF&V commodity by subjecting it to its optimum temperature, gas mix, and relative humidity. A controlled atmosphere, or "CA" refrigerated container van is one that closely regulates temperature, permits an altered gas mix and has some relative humidity controls. It is also equipped with an onboard computer, which aids in maintaining the various settings as well as collecting and storing information regarding temperature, gas mix, and relative humidity throughout the van's voyage.

Under normal conditions, the air we breathe is comprised of 78% nitrogen, 21% oxygen, and less than 1% carbon dioxide. [PSI 94] Depending upon the FF&V commodity to be shipped, this normal air mix is altered to reflect the optimum gas mix for that commodity or for a group of commodities that are deemed to be compatible in terms of temperature, gas mix, and humidity. There are eight groupings of commodities that are roughly compatible in this respect. This means that a group of compatible commodities can be shipped together safely in a controlled atmosphere container van that is configured uniquely for that group.

The gas mix on a "CA" configured van is initiated by reducing the oxygen levels, raising carbon dioxide levels, and setting the temperature and relative humidity. Infusing carbon dioxide, known as carbon dioxide "scrubbing", maintains the gas levels as determined by an onboard controlled atmospheric microprocessor unit. The success of the shipment is dependent on the produce variety, physiological age, atmospheric conditions, temperature, and time. [PSI 94]

Controlling the gas mix has been shown to greatly reduce the losses of perishable items by the following;

a) Retard senescence (aging). This occurs by reducing product respiration, slowing ethylene production, and physiological softening of tissues.

b) Produce sensitive to high levels of ethylene lose their sensitivity when oxygen levels are below 8 percent.

c) Produce sensitive to chill damage or develop other undesirable characteristics due to storage is reduced with controlled atmosphere.

d) Controlled atmospheres also inhibit pathogens from damaging produce.

e) Controlled atmospheres may kill insects and not damage some produce. [PSI 97]

There are some challenges associated with using controlled atmospheres. One challenge is understanding the ability of produce to survive in extremely low oxygen levels. Outlined below in Table 1 are some general tolerance levels, but these values can change with changes in temperature and humidity.

Table 1 - Produce tolerances to Low Oxygen Levels

Minimum Oxygen %	Commodity
0.5	Tree nuts, dried fruits, and vegetables
1.0	Some apples and pears, broccoli, mushrooms, garlic, onion
2.0	Most apples and pears, kiwifruit, apricot, cherry, nectarine, peach, plum, strawberry, papaya, pineapple, olive, cantaloupe, sweet corn, green bean, celery, lettuce, cabbage, cauliflower, brussels sprouts
3.0	Avocado, persimmon, tomato, pepper, cucumber, artichoke
5.0	Citrus fruits, green pea, asparagus, potato, sweet potato

a. Methods of generating controlled atmospheres

Three basic methods are employed to modify the ambient atmosphere.

-One method is to charge the ambient atmosphere with liquid nitrogen to reduce the oxygen concentration, and is followed by injection of carbon dioxide gas if necessary.

-A second method uses an air compressor and permeable membrane to separate storage air molecules into component elements. The nitrogen replaces the air inside the container while the oxygen passes to waste.

-The third method uses a catalytic burner that removes oxygen from the chamber by burning the oxygen molecules with either natural gas or propane. The natural gas is flameless but the propane is an open flame. This method has been replaced with the nitrogen purging system. [PSI 94]

2. Commercial and Military Airlift

Airlifts are currently conducted by United Parcel Service (UPS), Federal Express (FedEx), Northwest Cargo, and by Air Force C-141 aircraft. This method is costly (in excess of one dollar per pound) and does not necessarily get the customer a "fresher" product. However, it does create the perception on the customer's part that he is getting a fresher product. When a customer is aware that an item has been delivered by plane in one day, he often perceives the product to be fresher than products delivered by ship with a voyage time of eleven days. [Allman 97]

"Freshness" can be defined, where produce is concerned, in terms of physiological age and chronological age. Physiological age pertains to the shelf life of an item. Chronological age refers to how many hours, days, and weeks old an item is. The starting time is usually measured from the moment the plant is harvested. A product can be two days old chronologically, but be much older in physiological terms when compared to the same item subjected to a different set of environmental conditions. Every type of produce has its own post-harvest

sustainability. For instance, every hour that lettuce is maintained at a temperature above 70 degrees, one day of shelf life is lost. [Stroud 95]

It does not take long for produce to spoil while an aircraft is sitting on a runway in the high temperatures and humidity of the Pacific Rim aviation intermediate and final destination locations. Produce, residing in an aircraft located on the flight line, is not being maintained at its optimal temperature. An aircraft that experiences no delays or significant maintenance problems is rare. This is not to say that DoD or Commercial airlines are not performing adequately. Rather, just as in the airline passenger business, it is difficult to proceed from origin to destination without delays.

The overriding issue becomes the insulation used for maintaining the temperature in the containers used during airlift operations. Both commercial and military airlifted perishable material is maintained using dry ice, special insulated blankets, and thick wooden or cardboard boxes to contain the produce. This method of maintaining temperature is not an exact method. Humidity control is out of the question. [Kerber 97] There certainly is a necessity for airlifted produce to Pacific Rim customers. Special orders, high priority requirements, and the most sensitive perishable items require an aircraft delivery, despite the cost.

Airlift shipments are more costly than surface shipments. As in all transportation costs, weight is the driving factor in airlift shipments. Airlift shipments are weighed and priced on gross weight, which includes the product, the ice, the specially insulated blankets, and anything else that is a part of the

produce shipment except for the tare weight. Tare weight is the weight of the container in which the produce is being shipped. As a result, the *gross weight* (on airlift shipments) is considerably more than the *net weight* (which refers to the weight of the produce on other modes of shipment) of the item. Therefore, since it is more expensive to ship material by airlift, that cost is subsidized with appropriated funds for DoD customers to keep the produce at a reasonable price for the commissary patron.

3. Local Purchase and Prime Vendor

There are alternatives to moving products into Japan that have been grown and harvested elsewhere. One is the purchasing of FF&V on the Japanese local economy. While this virtually guarantees a marketable product, it does not guarantee a product that DoD customers desire. Japanese produce is different from produce grown in other parts of the world. Presentation, size, taste, and variety are all differences. Japan also has strict embargo and quarantine lists that severely regulate the import of non-Japanese produce. Therefore, many DoD patrons strongly desire to purchase and consume the produce with which they are familiar. That means produce that is the same as the produce they can buy in commissaries in the U.S. As a result of having many imported produce items on the local market and having less locally harvested produce items than the U. S., Japanese FF&V is considerably more expensive, making it a poor financial alternative for the DoD activity customer, and ultimately for the patron.

Overage products, Not-in-Stock (NIS) problems, long order and shipping times, Reports of Discrepancy (ROD), unsatisfactory material receipts and a general lack of visibility are a few of the factors driving the momentum to find a better solution. There is an initiative, promoted by DPSC, to use the PRIME VENDOR (PV) concept for Pacific Rim customers. PV will use a commercial distributor with the goals of providing a commercial product, reduced order and shipping times, a more marketable product, and with substantial savings to DoD.

Some of the challenges facing the Prime Vendor concept for Japan are inventory transition/drawdown (Wholesale and Retail levels), communication/systems, incorporating all "lessons learned" and customer feedback, surge requirements, verification of customer requirements, and legal Issues, (i.e., SOFA). [DSPC PV 97]

Some of the distribution concepts being considered are the "Out of U.S. Prime Vendor" to lease/own space, to own the product and perform in-country distribution, commercial distributor or government source to perform in-country distribution, the U.S. Prime Vendor to ship to an "out of U.S." Distributor (who would own and distribute products). Currently, DPSC is evaluating all of the advantages and disadvantages of these concepts. [DPSC PV 97]

It is important to understand the primary methods that are used to move FF&V into Japan in order to make a complete analysis of each mode's effectiveness for the DoD customer in Japan. The next chapter will examine the various customers, document the flow of the requirement to the delivery of the actual product, and the modes and methods used in the process. Mainland Japan has

certain geographical, cultural, and political idiosyncrasies, which will dictate the mode of shipment and method of delivery for FF&V.

4. Summary

In summary, the three modes by which DoD customers in Japan receive produce are CARTS, airlift, and local purchase. CARTS is economical, preserves shelf life and predictable. Airlift is expedient from origin to destination, but costly and lacks integrity with respect to temperature and humidity control. Local purchase offers immediate availability of local produce, but is limited in range of products which might be available.

Controlled atmosphere containers are cost effective and deliver the product in a better physiological condition to the point of embarkation than any other mode. This applies directly to supplying orders where the demand has little variance (i.e., the quantities do not vary much between orders). Commissaries have little variance in their seasonal demand rates, making CARTS the best mode for the overseas commissaries. What happens to the physiological age of the product from embarkation to delivery to resale destinations will be addressed in the following chapter.

IV. ORDER AND DELIVERY PROCESS

A. CUSTOMER REQUIREMENT TO DELIVERY OF PRODUCT

The preceding chapters have been a foundation for the intended purpose of this thesis, which is to document, describe, and analyze the entire process of ordering produce and the eventual receipt of the ordered material for mainland Japan customers. Understanding the organizations involved, the methods for delivery, and the impact they have on the process is critical to improving the process.

The process of ordering produce from an overseas location until the actual product is delivered to the customer is one that requires the involvement of several essential personnel at several organizations. This chapter will discuss this process in detail. How the requirement is transmitted to the supplier, DPSC, and subsequently translated by DPSC into a shipment, and ultimately the receipt of the material by the customer, will be analyzed in order to determine if the customer requirement is satisfied in an economical manner. For the purposes of this thesis, the action of ordering requirements will be assumed to be done by a produce manager at the DeCA Commissary located at Yokosuka, Japan, since it represents the largest customer in mainland Japan for DPSC and therefore poses the most important and difficult requirement to meet.

1. Order and Purchase of Product

Thirty days prior to the desired delivery date, the ordering officer (in this case, the produce manager at the commissary) determines his requirements. Upon

determining the line item and quantity of the items needed to meet the demands of his customers, he uses an order form, or template, that provides the average requirements for the ordering period. Any changes necessary are made to the standard order, and the order is then transmitted to DSO San Francisco by fax. Additional changes can be made by the ordering activity up to seven days in advance of the produce purchase by DSO San Francisco. [Thompson 97]

Upon receipt of the order at the DSO, the purchasing officer (otherwise referred to as the "buyer") develops a purchase document to facilitate the buy. The buyer takes the document and initiates telephone conversations with several personnel located in the specific geographic areas where the produce is purchased, inspected, and loaded. There are three methods by which produce on the West Coast is purchased:

a. Terminal Markets

This buying procedure takes place in the geographic area where the purchasing agent is physically located. The purchasing agent makes the buy in a competitive environment at terminal produce markets in San Francisco and Oakland, CA. Through visual inspection, in terms of coloring, size, grade, and stage of maturity, and determination of the best price, the buyer decides what to buy. The buy quantity is determined as a result of the purchasing document and the availability of produce physically located at the market. Buyers at the terminal markets will typically buy for several customers at a time in order to reduce costs by buying in volume (i.e., quantity discount) and reduce the number of trucks that must drive an hour or so south to the warehouse.

The purchasing agent buys the product on the spot. The produce is then transported by truck to the DSO San Francisco warehouse facility in Union City where it is unloaded, broken down by customer order number and temperature requirement.

If the pulp temperature of the commodity is higher than the optimum shipping temperature, the product is pre-cooled. Pulp temperature is the temperature taken at the core of the produce item. If it is too high, the load is placed in a refrigerated area in front of large fans, which pull cool air through the produce to rapidly cool it to its optimum temperature. This procedure accelerates the process of getting the produce down to the proper temperature. The produce is then loaded into forty-foot refrigerated "CA" van containers. The day prior to shipment from the port of Oakland, the vans are picked up and drayed to the port where they are loaded on to the contracted commercial ship carriers (currently Sea Land vessels).

Terminal markets not only have produce items that are grown and harvested in the U.S., but also from other parts of the world that grow items in demand that would otherwise be out of season in the U.S. Because of strict quarantine and embargo regulations, this can be an obstacle for shipping items to Japan, depending on the origin of the item. Ideally, DoD should be able to purchase and ship these produce items directly from the originating country. This issue will be addressed later as a potential recommendation for cutting the costs and fresher produce issues associated with produce that has been shipped from another country, sent to the U. S., then sent to Japan.

b. Car Lot Purchases

Car Lot purchases are buys that are made directly from the field for several customers in order to fill an entire van. Buying "in the field" means that the buyer will go to the actual location of harvest, and buy the required quantity at that location. Depending on the time of year and seasonal requirements, this can be as close as the Salinas Valley (only an hour from the DSO warehouse), or as far north or south as a day and a half transport by truck. Few customers in mainland Japan need an entire container of a specific item to meet the demands of the customer. Therefore, the buyer will buy enough of an item, or different compatible items to fill the van. The van will then deliver the load to the warehouse in Union City, where it will be broken down by commodity grouping and customer for transfer into refrigerated "CA" vans.

Often these purchases result in less-than-truckload (LTL) shipments to the DSO warehouse. As with the terminal market buys, these shipments stay in the refrigerated "CA" containers awaiting shipment to Japan. Delivery of produce to the DSO facility is usually timed to be within one day of loading on "CA" vans.

c. Source Loading

Source Loading is a form of buying that takes advantage of large customer orders that can fill a van with a single commodity and can therefore be sent directly from the field to the point of debarkation for sealift surface shipment. For example, if an entire van load of lettuce is required to meet the demands for several customers in Japan, the buyer will go out to the field, buy a full van load,

and have it loaded in a refrigerated van at that location. It will then be sent directly to the port for further transfer to the ship that will transport it across the Pacific to be broken down at the receiving port (usually Yokohama).

2. Booking and Shipping

Once the customer order has been purchased in one of the aforementioned methods, booking the shipment for ocean transport is the next step in the process. This is done by the Transportation Officer at the DSO, either directly with the shipping company, or through MTMC-WA for unusual or oversized shipments. [Gonzalez 97] The DSO transportation officer books the shipments based on cubing, compatibility, and the type of container required by the load. [Thompson 97] Cubing refers to the total cubic feet of space occupied by a given load. Compatibility is determined by the types of produce that can be stored in the same space without having an accelerating or otherwise detrimental effect on the other items in the container. Finally, the various compatible loads, and full loads of the same item, have different temperature and atmosphere requirements. There are different vans that meet the various requirements, and the booking officer has visibility and knowledge of this when he makes his booking decisions.

The shipments are booked 14 days in advance. Booking is completed by a transportation representative from DSO (about 70% of the shipments) and by MTMC-WA (the remaining thirty percent). Transit time from the port of Oakland to the port of Yokohama is approximately 12 to 13 days. [Gonzalez 97]

3. Receipt and Certification

When the shipment arrives at the port of Yokohama, commercial Freight Forwarders are used in expediting the receiving, customs clearing, and eventual distribution of the shipment to the various customers in Japan. The freight forwarders unload the containers at the docks in Yokohama. Once the containers are offloaded from the ships, they are opened and inspected for damage and general condition of the produce inside. Loads that are not full or properly loaded are often damaged enroute. The freight forwarders take pictures of the produce to document its condition. Upon documenting the physical appearance of the shipment, it is then inspected for quality and pest infestation by the local U.S. Army veterinary inspector.

All produce arriving in Japan must have a phytosanitary certificate of inspection, which clears it for entry into the country. This final certification will document that the shipment is not comprised of items on the quarantine or embargo list, that the region and area in which the produce was grown is acceptable, and the there are no life forms on the food that may preclude it from entry. Tables 2 and 3 delineate the specific quarantine and entry regulations for fresh fruits and vegetables destined for Japan. Appendix A is a copy of the Statement of Work, which specifies the functions and responsibilities for the freight forwarders in Japan.

Table 2

Japanese Plant Quarantine Status For U. S. Fresh Fruits And Vegetables 1/
(Excluding Hawaii)

A. U.S. Fruits and Vegetables Free to Enter Japan

Anise
Apples 5/
Artichokes
Asparagus
Avocados
Beans 2/
Beets 2/
Blackberries
Blueberries
Boysenberries
Broccoli
Brussel Sprouts
Carambola 3/
Carrots 4/
Cauliflower
Celery
Cherries 5/
Chicory
Chives
Corn
Coconuts
Cranberries
Cucumbers
Custard Apple
Dates
Endive/Escarole
Figs
Garlic 4/
Ginger
Gooseberries
Grapes
Grapefruit 3/
Green Beans
Green Onions
Guavas
Horseradish
Leeks 2/
Lemons
Lettuce
Limes 3/
Loganberries
Mangoes 3/
Melons
Mushrooms
Nectarines 5/
Okra 2/
Onions
Orange 3/
Parsley
Parsnips
Passion Fruit
Paw Paw
Peas
Persimmons
Pineapple
Pomegranates
Popcorn
Prickly Pear 6/
Pumpkins
Raspberries
Rhubarb
Rutabagas 4/
Sapodilla
Sapote
Shallots
Snowpeas
Soursop
Spinach
Squash
Strawberries
Tamarind
Tangerines 3/
Turmeric
Turnips 4/
Watermelon

1/ All fresh fruits and vegetables must be accompanied by a valid Phytosanitary Certificate issued by the U.S. Department of Agriculture.
2/ Excluding underground portion.
3/ Shipments from Florida must meet certain conditions for Caribbean fruit fly.
4/ Special certification for burrowing nematode required.
5/ Must be treated for codling moth in accordance with Japanese requirements. Entry limited to certain varieties only.
6/ Subject to endangered species certification (not a plant quarantine requirement, under MIT jurisdiction).

Table 3

Entry Into Japan Prohibited Due To Certain Pests

Apricots	Codling moth
Bell Peppers	Tobacco blue mold
Cabbage	Colorado beetle
Cassava	Sweet potato weevil
Chilies	Tobacco blue mold
Eggplant	Tobacco blue mold
Peaches	Codling moth
Pears	Codling moth
Plums	Codling moth
Potatoes	Potato wart/Golden nematode
Quinces	Codling moth
Radishes	Citrus burrowing nematode
Sweet Potatoes	Citrus burrowing nematode/Sweet potato weevil/Small sweet potato weevil
Tomatillos	Potato wart/Colorado beetle/Golden nematode/Tobacco blue mold
Tomatoes	Tobacco blue mold
Yams	Sweet potato weevil/Small Sweet potato weevil

While every attempt has been made to ensure the accuracy of this list, the final determination of importability will in all cases be made exclusively by the Government of Japan. The American Embassy cannot be held responsible in cases where agents of the Government of Japan rule in variance of this list. [Tokyo 95]

4. Delivery to Customer

If the produce is in acceptable condition, the freight forwarders then segregate it by customer. Freight forwarders then load the produce into refrigerated trucks and deliver the product to each customer. Once it arrives at the customer destination, the truck is backed up to the receiving docks and offloaded, received and stored by the receiving activity.

For most of the customer destinations in Japan, the warehouse and storage areas in which the incoming produce can be stored is small. Although orders are submitted by customers on a weekly basis (for delivery some 30 days later), the produce managers can only accommodate about half of their entire weeks' order in their warehouse. Therefore, the freight forwarders have established a system of delivering produce to each customer two times per week, despite the fact that they receive commercial ship deliveries on a weekly basis. The freight forwarder holds half of the shipment at his warehouse close to the port. This eases the burden on the customer by allowing for better receipt, storage, and merchandising of the produce for the DoD patron. [Thompson 97]

Figure 4 visually depicts a simplified flow of the logistical process from customer requirement generation to delivery of product.

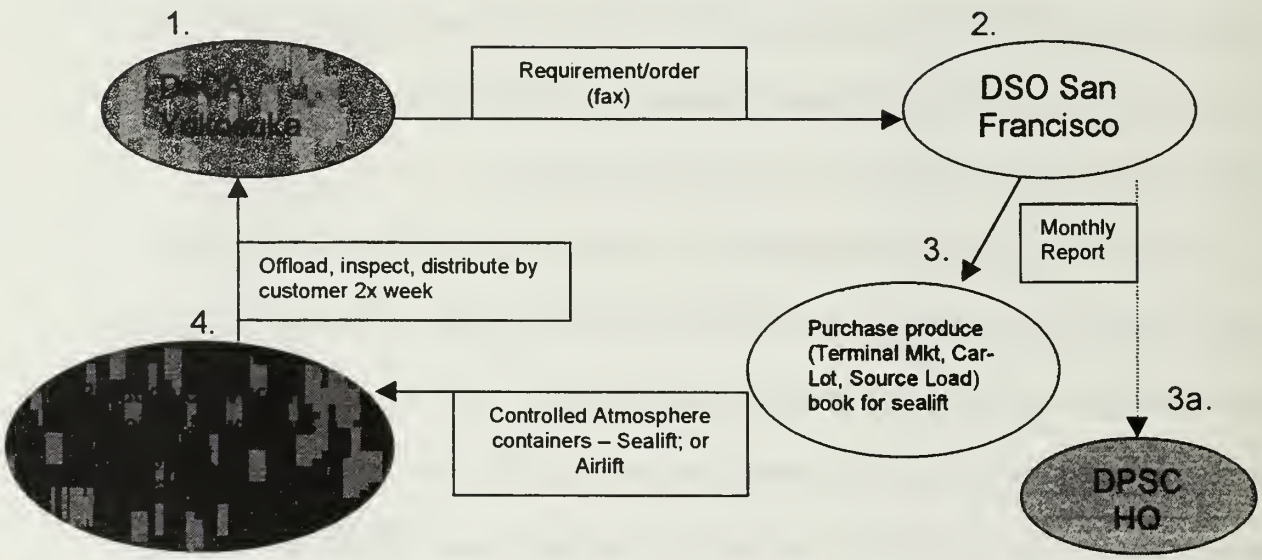

Figure 4

B. PROCESS ANALYSIS

The process is working. However, as with most processes that have numerous personnel and activities involved, it is vulnerable and must be meticulously managed if it is to continue to meet the requirements of the customer. Demand and customer desires fluctuate. Every customer service operation must have the ability to adapt to different market climates as they arise. Therefore, it is critical to understand the products being marketed, the entire process in which they are ordered and delivered, in detail, and then develop protocols that must be rigidly followed to ensure customer satisfaction at minimal cost. Once the product and processes are understood, contracts that will reflect

both can be written, and management information systems can be developed that will add value to the process. Management information systems are critical to the process in that they have the ability to correlate data from numerous inputs and functions, making management decision-making more informed and easier.

In any logistical operation, the more people that are involved in the process, the more opportunities exist for that operation to make mistakes, incur unnecessary costs, and the longer it takes to get the product to the customer. Every time a shipment is handled, extra costs are associated with that shipment. Transportation and handling are the largest costs of any material movement process, and this one is no exception. The following paragraphs will identify the portions of this process that may lend themselves to being streamlined and improved.

1. Order Submittal

The orders are currently being faxed from the activities in Japan. When the order is received by the DSO, it must be manually reproduced by a person working at the DSO so that it may be translated into a purchase. After the 1930 purchasing document is developed, the buyer can make the purchase. After the produce is bought, that information must go to the transportation officer at the DSO so that it can be booked for shipment. Yet another document for this information must be compiled to send the monthly transmittal to DPSC Headquarters.

The fax order is in a template format which already has the average requirements for each activity already identified. The ordering activity is required

to verify the requirements and make changes as necessary. This is good for the ordering customer, but can lead to problems if every order is not scrutinized. Faxing can be difficult if telephone lines are not available and the quality of faxed documents can be difficult to read. More than any other issue concerning this, the fact that information must be manually reproduced is of concern. Sending in requirements via electronic mail (email) on a standardized template would resolve this problem, especially if this email file could be sent to the purchasing officer, transportation officer, and to DPSC HQ without any further human intervention. A front end database program that accumulates data which is passed electronically to various DPSC systems and transportation systems would be extremely beneficial. It is attainable with today's information technology.

2. Distribution Layers

Removing distribution layers, and therefore minimizing the handling of the product is the key to both shortening the order and shipping time as well as the costs associated with these functions. Source Loading as many shipments as possible is clearly an attempt to do this, however most of the shipments are not purchased in this manner. This is because many of the customers do not require, and in fact cannot handle full vanloads of single line items of produce in their warehouses and receiving locations. This puts the management burden on the DSO to consolidate as many orders as possible of same and compatible items for shipment. The more orders that can be source loaded at the field location and sent directly to the port will reduce the unloading at the DSO

warehouse and subsequent reloading at the port. The product will also be physiologically and chronologically fresher, not having undergone handling at various intermediate points.

C. PROCESS IMPROVEMENT

The biggest process improvement to be made to the DSO delivering produce to Japan is in the area of receiving orders and translating them into buys and subsequent produce shipments. Development of a template database that will be compatible with the customer, DSO-San Francisco, and DPSC-HQ databases will remove mistakes and time from the process. Shortening the process will lead to better order and shipping timelines. This is good for the customer. Local (otherwise known as domestic) deliveries on the West Coast are routinely conducted when a customer provides only one days notice. With today's prevalent use of electronic transmission and Internet access, the overseas customers should be able to order online using a template database. The potential here for DPSC to develop a Web Site that houses an FF&V management information system seems possible. This recommendation will be addressed in more detail in the following chapters.

V. PROCESS EVALUATION AND RECOMMENDATIONS

A. DIFFERENT PERSPECTIVES - SIMILAR ISSUES

There are various perspectives on what is important within the process of shipping produce from the U.S. to mainland Japan. As is the case in most DoD processes, information about the process in its entirety is compartmentalized. There is at least one person that knows everything about one particular portion of the process, but few, if any, understand the entire process and the associated issues. That is understandable given the complexity of political, cultural, logistical and contractual issues within this process. The remainder of this chapter will attempt to provide the perspectives of the various activities as to the real problems in getting fresh produce to customers in Japan. In doing so, common themes will emerge, lending themselves to recommendations.

1. DPSC-Headquarters

The political climate, in the form of embargoes and quarantine regulations, is clearly the biggest obstacle as far as DPSC-HQ is concerned. [Amato 97] Because Japan will not allow such items as Bell Peppers in country, DeCA is placed in a difficult position attempting to please the commissary patron that wants to consume such an item. In fact, even the technology of CARTS can do nothing to deal with this issue. Telling the patron that he will just have to do without Bell Peppers for the next few years is equally unacceptable. Although CARTS solves many problems, it is not a panacea. [Amato 97]

2. DPSC- Pacific

The biggest single issue with the management staff in Alameda is of course trying to ensure that good customer relations are maintained between DPSC and each of the customer activities. Ultimately, this can only occur when the customer gets what he wants, when he wants it, and in the proper form and quantity. This enables the activity to do its job in a satisfactory manner. Unfortunately, the commissaries are under pressure to reduce their appropriated budget before the committees in the House and the Senate. [Allman 97] This is important because it is appropriated funds that subsidize the transportation of goods destined for the DeCA commissaries. This in turn has an impact on airlifted produce (previously discussed as being much more costly than sealift). It is thought that some produce, due to its sensitivity, must be airlifted or it cannot be effectively delivered in country. As "CA" technology becomes more sophisticated, more produce will be able to be shipped by sealift at lower cost.

Other chronic problems are the plant control rules and regulations (pest infestation and other environmental circumstances that affect the condition of the produce) and fumigation. [Allman 97] If a produce shipment has any foreign life forms, such as insects, in it, it must be fumigated. At a minimum, this process will shorten the shelf life of the items in the container. When fumigation occurs, 30 to 40 percent losses are not unusual. Additionally, disposal charges are levied. More importantly, the customer does not get a full shipment of what was ordered.

The Pacific representative from DPSC has many alliances and people with whom to maintain relationships, including the commercial shippers, the customer (DeCA), Headquarters, and in some ways, the DSO. The coordination of policy and customer service satisfaction mandates that DPSC stay in contact with the customer while working with the DSO to aid in the process.

3. DSO-San Francisco

The personnel at DSO are concerned with the operational issues; buying, booking, temporary storage, and shipping. Therefore, their issues center around the orders form the customer, whether or not that order can be accommodated, and how to best get the product to the customer. They are the front line to the customer. While things are working in a satisfactory manner, the processes of receiving and disseminating information can be improved.

DSO-San Francisco requires the ability to perform data file transfer. Valuable time and money is wasted faxing and expressing documents to overcome poor communications with its customers. Faxes, telephone calls, and the other methods by which orders are placed require separate manual actions by DSO personnel for confirmation, tonnage reports, and monthly availability reports. If a single management information system existed that identified each step of the process, accepted data from each step, and subsequently had the ability to produce buyer forms, booking requests, and various periodic reports, this task would become much easier. This would allow DSO personnel to spend more time in satisfying the customer.

4. Commercial Shipping Perspective

DoD, through MTMC-WA, contracts most of its overseas shipments with APL and Sea Land. Both companies are the industry leaders in moving products by sealift to any location in the Pacific Rim. Their private industry successes are common knowledge to anyone that works in this area, and as a result their opinion and expertise is welcomed and appreciated. From the perspective of the commercial shipper, DoD uses "CA" technology better than any other customer does. Out of some 500-600 shipments per week in specialized containers, DoD comprises over one-fifth of the total shipments going to the Pacific Rim. [Mensing 97]

DoD has a good working relationship with both Sea Land and APL, and has therefore negotiated contracts that take advantage of the commercial shippers ability to move products overseas predictably and with minimal damage. One reason these companies like to do business with DoD is that DoD is not subjected to the same rigid rules and regulations as commercial shippers.

It should also be noted that the commercial perspective includes a philosophy which is more customer service oriented than what appears to be the case with DoD as far as fresh produce is concerned. Commercial companies spend a great deal of their resources to understand every step of the process so that they can do whatever it takes to make the customer happy. According to the various commercial representatives interviewed, DeCA is the primary customer for DPSC. As such, all efforts should be placed on giving DeCA exactly what it needs. Therefore, contractors for DPSC must be aware of every specific issue

that is important to the customer prior to letting contracts with commercial companies and vendors. Only then will the contracts that are enacted be reflective of what the customer requires. Otherwise, it might be in the best interest of DeCA to contract directly with private companies for the purchase and delivery of fresh produce. From a private industry perspective, this would eliminate the middleman, or broker, who is defined to be DPSC in this situation, and thus streamline the process further. As discussed earlier, streamlining the process will minimize costs and lead to shorter order and shipping times for DeCA. DeCA would require logistics and contracting specialists to successfully accomplish this. [Brecht 97]

B. RECOMMENDATIONS

It is widely agreed upon at all of the aforementioned activities and organizations, that knowledge of the entire process, from customer requirement generation to delivery of product, is the most important step to better understanding how to improve the process. Simply understanding one portion of the process is not only limiting, in terms of what can be achieved at that particular function, but it can be detrimental to other functions preceding and following.

1. Fresh Fruits and Vegetables Management Information System (FFVMIS)

One way to resolve this issue is to develop a Management Information System (MIS) that can accommodate all of the data inputs from any portion of the entire process. An FF&V MIS that has customer, vendor, transportation company, and DoD profiles that will allow every functional area to have visibility and understanding the impact of their actions on the process. This information

system should have the ability to receive orders from the customer, perhaps using a Web page on the Internet, or at a minimum, through the use of email. This would eliminate the manual receipt of an order by fax, which in turn leads to the manual re-entry of information in several different locations and databases. This system would give the purchasing officer visibility of the order, provide immediate information on vendor profiles, competitive prices, and options for method of purchase (Terminal Market, Car Lot, or Source Load). Concurrently, the transportation officer would be able to scan the potential order to be filled, deciding on what type of containers will be required, when the shipment will need to leave to meet customer requirements, and by what mode (CARTS, airlift). The warehouse would receive information on incoming deliveries, customer destination, van assignment, and loading instructions.

By performing the above functions simultaneously, it will result in a more streamlined process and will reduce the order and shipping time for the customer. Reduced order and shipping time is directly related to customer satisfaction in terms of receiving perishable products.

Until this is done, the true focus of satisfying the customer will be obscured by each functional area within the process attempting to do what is determined to be best for that function, as it is defined by that area. The implementation of FFVMIS can solve many of the mistakes, human errors, and time delays associated with delivering fresh produce to mainland Japan.

2. Local Purchase in Japan

This has just started to occur in mainland Japan, and it appears to be successful. [Graven 97] The key to this initiative is to create competition among the various local vendors. The products bought buy the contracting specialists are Japanese produce items. Although this is contrary to providing American produce, it is an attempt to fill the product "void" created by the strict quarantine and entry regulations imposed all imported produce.

VI. CONCLUSION

A. THESIS IDEA

The motivation behind this thesis was to document and understand the process of the DoD shipment processes for fresh fruits and vegetables to DoD and non-DoD customers in Japan. The organizational relationships among the activities involved in the process were briefly described and analyzed. DPSC, as the lead organization on making this process happen, was examined, in terms of what organizations perform certain functions to move the material overseas. Background on the DPSC organization and the history of subsistence support within DoD was provided. A listing of the customers DPSC serves is also defined, with some specific issues and peculiarities attributed to some of those activities and their geographic location.

The modes by which fresh produce is transported into mainland Japan from CONUS is described and analyzed in detail. Commercial technology and the use of commercial shipping companies is a critical portion of the process. Sealift (in controlled atmosphere containers known as CARTS) of produce was compared to airlift and local purchasing of Japanese products.

The driving force behind any logistical operation is getting the product to the customer in the right quantity, when and where he wants it. Reducing the variability of the shipments, in terms of quantity, quality, and time of delivery are directly proportional to reducing order and shipping time. DPSC has many customers in this operation they must satisfy. Their largest customer, the resale activities (commissaries), must be tended to by performing this operation in a cost effective manner, and they must satisfy a variety of suppliers with whom

they have contractual obligations (commercial shippers, vendors, other DoD organizations, etc.).

B. PROCESS RECOMMENDATION

After describing the process and attempting to understand the value each organization adds to it, this thesis suggests that a Fresh Fruit and Vegetable Management Information System (FFVMIS) should be prototyped at DSO San Francisco. Such a system will significantly assist the DSO in minimizing errors, save time, and provide management information that will shorten the order and shipping time for the customer. This would be possible because the DSO functional areas will have increased visibility of orders, vendors, and customer profiles. [Kerber 97] The DSO Chief will have access to numerous management reports in a format that will enable him to provide information in both directions (to the customer as well as to his chain of command). This would make his job easier by letting him do what is important – ensuring the customer is getting what he wants.

The implementation of FFVMIS is one area where process improvements can be achieved, if for no other reason, because it supports protocols developed in the model. This forces all personnel involved in the process to better understand it, and therefore better understand the contribution they make to the process. This will undoubtedly lead to higher level of customer service, while at the same time, decreasing the manual workload on the DSO.

Finally, a daily decision management chart for shipping items that are perishable has been developed for application to other Pacific Rim destinations.

This Daily Process Management (DPM) chart visually represents the process and the critical decisions that must be made at each step. [Brecht 97] Appendix B contains the chart.

C. FURTHER RESEARCH

1. Complete Development of FFVMIS and Initiate Implementation at DSO San Francisco.

Developing sound ideas for process improvement is easy, the implementation is a different matter. Further work should document the installation and implementation of the aforementioned management information system to evaluate the impact it has on the process, keeping the customer in mind.

2. Analysis of Shipment Strategies and the Particular Issues Associated with Korea, Guam, Okinawa, and other Major Pacific Rim DPSC Destinations for Fresh Produce.

Japan is different from the other locations in the Pacific Rim, especially in terms of entry regulations and in country logistical challenges. The same process decision chart in Appendix A could be compared to the process for another country.

3. Financial Analysis of DeCA Contracting Directly with Commercial Companies for the Delivery of Produce.

It is the opinion of some commercial companies that if DeCA removed the middleman in the operation, DPSC, that money could be saved without sacrificing customer service. DeCA needs expert overseas logistics, FF&V product specialists, and contracting personnel to accomplish this successfully.

4. Detailed Analysis of Controlled Atmosphere Reliable Transportation System (CARTS).

CARTS technology may have international implications in DoD shipments and private industry in limiting quarantine and entry regulations worldwide. The potential for enormous impacts on global sourcing of fresh produce is made possible by maximizing commodity groupings and gas mixes. CARTS technology may be able to progress not only in retarding the aging process of FF&V, but its use as an insecticide should be examined in detail. Eradicating the introduction of foreign life forms into Pacific Rim countries may break down trade barriers previously thought impenetrable.

APPENDIX A. STATEMENT OF WORK - FF&V DISTRIBUTION CONTRACTORS IN JAPAN AND KOREA

This appendix is a reproduction of portions of the DESCRIPTION/ SPECIFICATION/ STATEMENT OF WORK that DPSC has contracted for commercial freight forwarders to perform with respect to receiving, clearing, storing, and distributing Fresh Fruits and Vegetables (FF&V) in Japan and Korea.

N62387-94-C-9502
FF&V
Section C

C-1 GENERAL

C-1.1 Basic Services. The purpose of this Contract is to establish the contractual terms pursuant to which the Contractor agrees to accomplish the distribution and transportation of perishable subsistence (fresh fruits and vegetables) as described herein. The required service shall encompass drayage of loaded reefer containers from designated ports in Japan and Korea to a bonded cold storage facility, drayage of the returned empty reefer containers to the ocean carrier at the ports in Japan and Korea, performance of all agricultural clearance services, cargo stripping, sorting and stuffing, plus transportation to consignee's door. Customer clearance services shall include but is not limited to the entire clearance process, including inspection procedures, temporary refrigerated storage, sorting, fumigation, and possible destruction of cargo.

C-1.2 Description of Accessorial Services

A. Warehouse Storage – The contractor shall move fresh fruits and vegetables (FF&V) in reefer containers from ports in Yokohama, Japan and Pusan, Korea to a bonded cold storage warehouse in Japan/Korea where the cargo will be stripped and placed into refrigerated rooms. The FF&V shall be stored in the bonded facility throughout the clearance process and during the sort

process; in the sort process the FF&V will be divided between two temperature rooms. One large room, for mixed commodities, shall be set and maintained at 38 degrees Fahrenheit; and one smaller room, for tropical commodities, will be set and maintained at 55 degrees. The storage facility must have enough floor space to accomplish the sort.

B. Customs Clearance/Government Inspection – The contractor shall clear FF&V through the Government of Japan (GOJ) Plant Quarantine & Inspection Office and the Government of Korea (GOK) Agricultural Office. The contractor will deliver the FF&V shipping papers to the GOJ/K inspector and coordinate the selection of inspection samples, and the delivery of said samples to the appropriate inspection station. Contractor will hold commodities found free of insects in the refrigerated holding area awaiting remainder of shipment. Contractor will remove infested commodities from the holding area and take these to the GOJ/K fumigation station. After the fumigation process is complete the commodity is reinspected by GOP/K. If the fumigation process fails to kill the insects after two attempts, the contractor shall destroy the infested commodity.

C. Delivery to Consignee – After reefer container contents have been cleared for delivery, the commodities are sorted into separate shipments for individual consignees. Specific consignee orders (detailing required quantities of each commodity) will be provided to contractor by Defense Personnel Support Center Pacific (DPSC PAC) at least seven days prior to vessel arrival. The contractor shall load sorted shipments into reefer trucks and deliver the appropriate shipment to each consignee. The reefer trucks shall be maintained at the temperature specified on the distribution manifest for the commodity(ies) being transported.

D. Transit Times:

1. Japan shipments shall be delivered to consignee within 96 hours after container availability.

E. Temperature Requirements:

1. Temperature tolerance is plus or minus two degrees from the van's set temperature.

F. Documentation Requirements – Defense Personnel Support Center will provide the contractor with the *original* phytosanitary certificate (phyto), FF&V invoices, a packing list, (copies of DPSC form 2005), a distribution manifest (provides the number of boxes by commodity for each consignee) and a material inspection and receiving report (DD Form 250).

C-2 TRANSPORTATION SERVICES

C-2.1 Drayage Service. The contractor assumes all costs and risks for moving the loaded refrigerated containers from the ocean carrier's facility to the contractor's warehouse facility, and for the return of the empty containers to the ocean carrier's facility. The contractor shall check the internal temperature of the container prior to acceptance from the ocean carrier. If the temperature has not been maintained within 2 degrees Fahrenheit of the documentation temperatures, contractor shall advise DPSC for disposition determination. Contractor is responsible for maintaining temperature gauges at the appropriate settings from the time of pick-up until cargo is offloaded.

C-2.3 Delivery. The contractor is responsible to deliver the cargo to the government designated consignees as stated. Consignee is responsible for labor, unloading equipment and handling operations associated with unloading cargo from the delivery vehicle. Contractor will obtain signature from consignee on the distribution manifest at time of delivery, including notations as to temperature and condition of cargo.

C-3 CUSTOM OF THE TRADE

Wherever the standard of performance by either party under the provisions of this contract is not stated herein, then the "Custom of the Trade" shall be used as the standard of performance outside any port area. This phrase shall mean the established practice generally accepted by the Trucking, Rail and Marine

Shipping Industries for transportation service in the geographic area where the service is performed or to be performed.

APPENDIX B. DAILY PROCESS MANAGEMENT (DPM) CHART FOR OVERSEAS SHIPMENTS TO JAPAN

The chart on the following pages portrays the entire process of ordering, buying and ultimately delivering FF&V to overseas customers. This chart was completed in coorperation with Dr. Patrick Brecht, P.E.B. Commodities, Inc.

Current Fresh Fruit and Vegetable Process to JAPAN

Time Line	Overseas Customer	Procuring Office (DSOA)	Military Traffic Management Command (MTMC)	Carrier (APL)	Atmosphere Supplier (TransFRESH)
3 weeks prior to vessel sailing		1 DSOA initiates simplified booking process	2 MTMC monitors booking process	3 Carrier receives and accepts booking	
	4 Customer Needs Produce	5 Account representative interacts with customer to establish the customer's weekly baseline needs			
		6 Input weekly needs into database for just in time inventory			
19 to 21 days Total Order/ Ship time		7 Account representative calls customer for exceptions to the baseline needs			
4 to 5 days		8 Start buying process			
		9 Warehouse receives produce. Produce is stored in correct temperature and atmosphere			
		10 Inspect produce for quality			

DEFENSE LOGISTICS AGENCY

DEFENSE PERSONNEL SUPPORT CENTER

AMERICAN PRESIDENT LINES, LTD.

TransFRESH

2 to 3 days
Vessel Sails
11 days transit
2 days
Call carrier for container dispatch
Quality Assurance Prechill
Present containers
Load container for multiple crops with proper air circulation and commodity mixes
Dispatch containers
Dispatch container to port
Apply controlled atmosphere
Load container to ship
Ship sails Arrive at discharge port
Freight forwarder Works as customer
Facilitate customs clearance and quarantine inspection
Delivery to multiple customers
Customers call for delivery
Check and Inspect produce
Produce is maintained at constant temperature throughout. Multiple stops eliminates rehandling and distribution
Produce OK and Insect Free?
No
Yes
Produce fumigated and/or discarded
Produce usable?
No
Yes
Produce discarded
Offload produce at customer
Warehousing and retail sale of produce
Process Enhancements

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